Smart goannas: can we teach wild goannas not to eat cane toads?

PROJECT UPDATE | 2014

Background

The animals of northern Australia are in trouble! Their populations have been declining due to feral animals, inappropriate fire regimes and poor land management.

One invader, the cane toad, is having a big impact on our native predators – quolls, snakes and goannas. From a biological point of view, these animals play an important role in the ecosystem and they are culturally significant for Aboriginal people across the north. Goannas in particular are a big source of bush tucker, so maintaining their populations keeps cultural practices and stories strong for Aboriginal people.

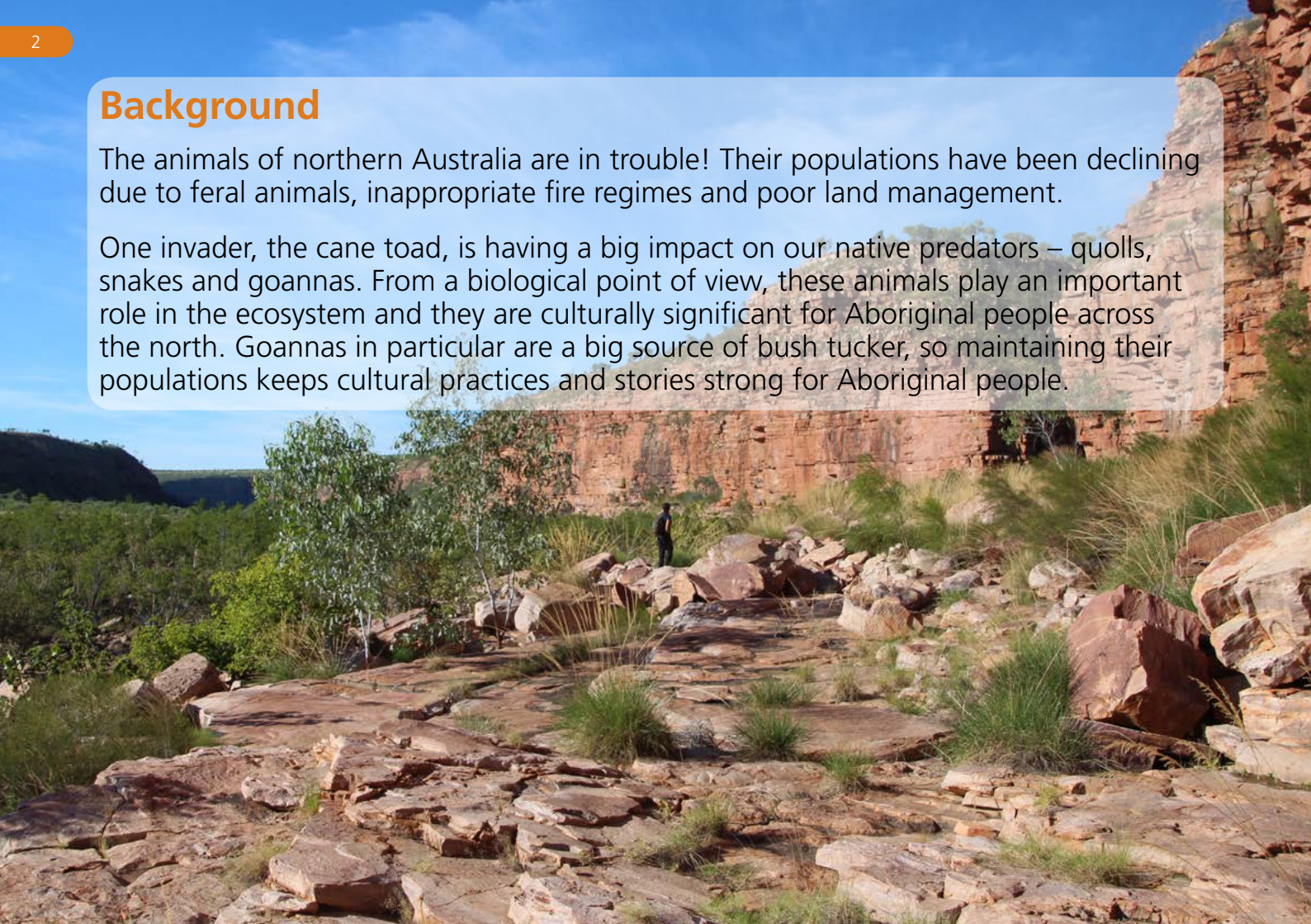


Photo credit: Gondwana Productions

Photo credit: Jonathon Webb

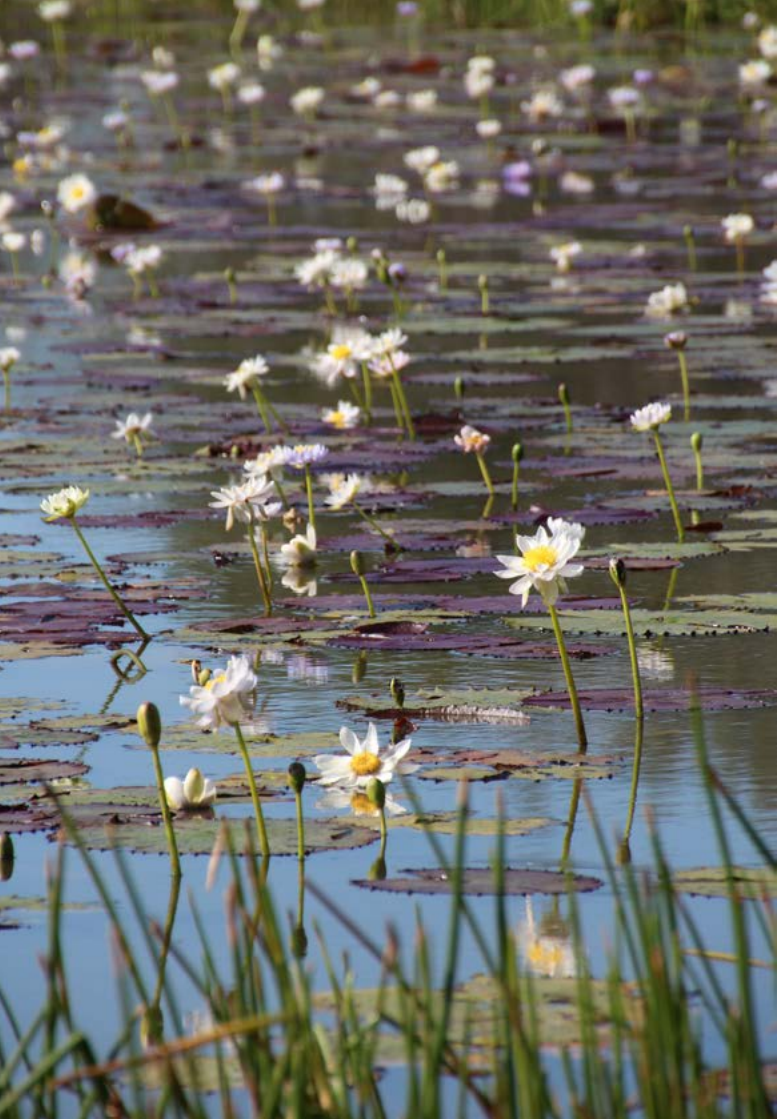
Goannas and the Balanggarra people

"Goanna is number one bush tucker for us mob. In the rainy season we eat goanna and in the cold season we eat turkey (bustard) because they fatter. Never take too many, one or two when we go. We need goannas to keep us hunting, keep us walking around country and keeping bodies fit. We need them there for our children…so they can grow up like we did, so we can teach them how to hunt and track, so they keep our knowledge. Sometimes we use goanna dog. You gotta train the goanna dogs when they small, we get the bladder of goanna and bust it on the dog's nose. They get the smell, then they know the smell. You keep doing that when they small and you get a good goanna dog. Them dogs go a long way for goanna, and when you hear them going mad you know they close…

The old people are happy just to know that goanna are still here 'cause the country is healthy. When they go to different country, the old people always asking, 'How many goanna there?'"

Quentin Gore

Balanggarra Traditional Owner and ranger



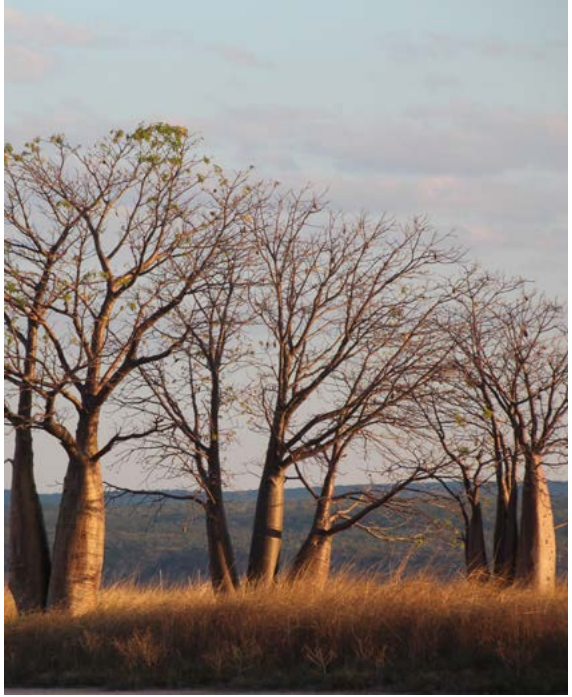


Photo credit: Melissa Bruton

Who are we?

This is a collaborative conservation project between:

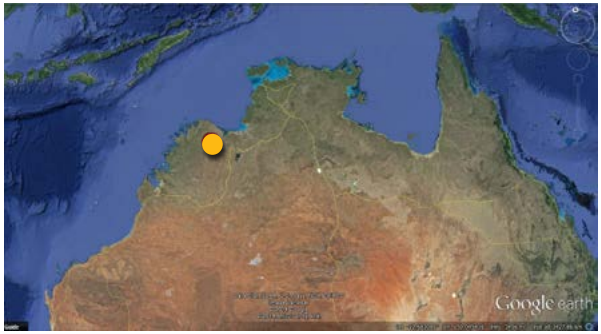
- The Shine Lab at the University of Sydney (USYD)
- The Department of Parks and Wildlife, Western Australia (DPaW)
- The Balanggarra people - represented by the Balanggarra Corporation - Traditional Owners of the north eastern Kimberley


Photo credit : David Pearson

Where are we?

Georgia Ward-Fear (USYD) and David Pearson (DPaW) are working closely with the Balanggarra ranger group and Traditional Owners on country in the north eastern Kimberley.

Field work is happening on a remote floodplain of the Forrest River. We are based at the old community of Oombulgurri. This area lies within the Balanggarra Indigenous Protected Area and this work fits into Balanggarra's Healthy Country Plan.



What are we doing?

The main aim of our work is to aid the survival of goannas as the cane toad invasion moves through the Kimberley.

We are trialling a new technique called 'Conditioned Taste Aversion (CTA) therapy'. We expose goannas to small doses of toad toxin (young toads of a certain size) just before the real cane toad invasion front reaches an area. These small toads will make the goannas sick but won't kill them. The hope is that when those goannas later come into contact with a large adult toad from the invasion front, they will remember their experience with the small toad and not eat the large toad that could kill them. We call these young toads 'teacher toads' because they teach the goannas not to eat the larger cane toads.

Goannas do not look after their young, so they cannot pass this learning behaviour on, but if we can preserve enough of the breeding adults for a longer period of time, the population will be buffered from the first intense wave when the big cane toads arrive. This means that more goannas may survive than if nothing was done. Once the cane toads start breeding (approximately two wet seasons after the first invasion), there will be smaller toads in the environment and natural situations for this learning response to occur.

Smaller goannas are unlikely to attack the large toads, and they are less likely to die from eating the small toads because they contain less toxin.

1. Natural situation

Goanna meets a big toad in wild and eats it

Toad kills goanna with toxin

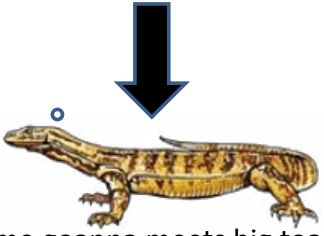
2. Teacher toad situation

Goanna fed a small ‘teacher’ toad

Goanna eats teacher toad and gets sick

Goanna survives

Doesn’t eat big toad



Later, same goanna meets big toad but remembers bad experience with small teacher toad

How do we train goannas?

1. **Catch goannas by hand when we find them.** Goannas start their day as soon as the sun comes up, so by that time we are already out searching for them.
2. **Take each goanna back to base to collect important information** such as body size and condition, sex, age, DNA and poo samples.
3. **Fit a radio tracker to their tail and release them** so that we can find them later on.
4. **Train them in the field** by first radio tracking them (using an antenna and radio receiver to pick up the signal coming from the tracker on their tail). Once found we approach the goannas when they are foraging for food and give them a teacher toad to eat. We repeat the training at set intervals.
5. **Monitor the survival of trained versus untrained goannas**, once the cane toad invasion moves through.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Field work

From October to July we track and train the goannas, and collect lots of interesting ecological information about them, including:

- Which sexes/sizes respond better to the teacher toad training.
- When the best time of year is to train the goannas.
- How far different goannas move and which habitat they use throughout the whole year.
- What they eat, how they breed, and how they interact with other animals.
- How goannas respond to dry season fires.
- How important goannas are in regulating the food web.

We also collect information about general floodplain ecology and feral animal management. As the cane toads invade the field site, we measure and radio track them. We will investigate how they use the landscape, their patterns of dispersal, and their impact across the seasons. With this information we can target the teacher toad training more accurately and implement techniques to control the toads more effectively.





Heliwork WA

Types of surveys and equipment

To get all of this information about goannas, general floodplain ecology and the overall health of the country, we use different biological surveys and equipment:

- Track and scat surveys
- Habitat walking transects
- Radio tracking (goannas and cane toads)
- Remote field cameras
- Elliot and funnel traps for small mammals and reptile
- Pipe trapping
- Temperature loggers
- GIS mapping programs

Remote field camera photos


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Early results of the teacher toad training…

We are finding that goannas who eat small teacher toads are highly unlikely to eat another one in subsequent trials. The result is the same for both male and female goannas. This means goannas are able to remember their bad experience eating smaller toads. Whether this translates into a dislike of larger toads is yet to be seen but the results are promising.

Where to from here

The project will continue throughout the 2014-15 wet season, and the main cane toad invasion front will reach our site in the coming months. By early next year we should know whether taste aversion is a viable tool for the conservation of goannas in tropical Australia. If it is, we will develop a technique to administer CTA on a landscape scale.

We will continue to study the floodplain environment. We will also conduct general wildlife surveys and look at feral management issues in more depth. Specifically, this means understanding how we can preserve our native fauna from the impact of invasive species (cane toads, feral horses, cattle, and invasive plants) in pockets of the landscape like this floodplain.

Our collaboration is a very good example of how western science and traditional ecological knowledge and experience can be used together to achieve good conservation outcomes.

Acknowledgements

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- Department of Parks and Wildlife Western Australia, through the Kimberley Science and Conservation Strategy
- Kimberley Land Council
- Wildlife Preservation Society

We are grateful to Balanggarra, the Traditional Owners of the north eastern Kimberley for allowing this project to take place on their land, and for providing logistical support and field assistance. Ranger coordinator Thomas Grounds, his predecessor Rowan Clarke, and staff from the Kimberley Land Council have been very supportive.

Volunteers and field staff have devoted their time to this project and we are extremely grateful.

For further information or to volunteer on this project please contact project leader Georgia Ward-Fear at georgia.ward-fear@sydney.edu.au

THE UNIVERSITY OF SYDNEY

Department of Parks and Wildlife

BALANGGARRA RANGERS

Kimberley Land Council

For more information on this research please contact the project leader and author Georgia Ward-Fear georgia.ward-fear@sydney.edu.au

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